TITLE OF THE INVENTION

APPARATUS FOR AND METHOD OF CONVERTING LOCATION INFORMATION, AND COMPUTER PROGRAM PRODUCT THAT IS USED THEREFOR

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an apparatus for and a method of converting location information, which is suitable for use in recording an image pickup by a camera and information indicating a pickup location thereof into a recording medium, and to a computer program product that is used therefor such as a computer readable storage medium.

Description of the Related Art

It is useful to record the information regarding the locations at where the images are taken (including the locations such as a latitude and a longitude, a place name such as an address, a name of building, a location name such as a sightseeing place, etc. and the likes), together with the images taken by a camera, when appreciating the images in a various kind of ways thereafter, and thus there are proposed the various kinds of ideas for recording information regarding the locations at a time when taking the images.

For example, in Japanese Patent Laid-Open No. 6-110117,

there is disclosed the invention in which a database for location information and a selection means for selecting from the database location information with which an image is recorded, are provided in a camera, and desired location information is selected and operated by a photographer at a time of picture-taking so as to record the location information on a photo film together with the image. Herein the location information is a so-called place name, and it is recorded on the photo film as character information.

Further, in Japanese Patent Laid-Open No. 4-70735, there is disclosed a camera in which two detecting means, such as a detecting means in a positioning system by a GPS (Global Positioning System), and a detecting means of information from a system that provides location information that is characterized in a specific location or a region in a FM wave are provided with the camera, and either one of the detected results of the two detecting means is recorded in a memory card along with an image taken in accordance with a predetermined order of priority.

Moreover, in Japanese Patent Laid-Open No. 8-36217, there is disclosed a detecting means of a positioning system by a GPS to a camera, and a camera for recording detected location information along with an image on a photo film by encoding the detected location information, and an apparatus for printing converted information on a photographic print,

or for displaying it on a TV monitor, as reproducing location information that is encoded from the photo film after having been taken, and then converting it to information which is understandable by human beings, such as a place name and the likes by collating it with a database.

Information for a location associated with an image (hereinafter, it is referred to as location information) could be utilized in a variety of ways in accordance with an appreciation aspect of an image. For example, it is considered that a picture-taking location may be clarified by printing it with an image on a photographic print, or by displaying it with an image on a TV or a CRT monitor. In this case, it is preferable that, as the information for the location, the place name, the location name and the likes are displayed as character information.

In an academic usage and the likes, it is preferable that the latitude and longitude information based on the detected results of the positioning means using the GPS are recorded as they are, and are displayed along with the image.

Further, in a usage to facilitate an image retrieve for each of the picture-taking locations by constructing an image database within a computer, it is convenient to provide a code list in which the predetermined codes are provided for each of the locations and to record the location information with these codes. This is because it

makes possible to make a memory capacity for recording or for storing to be a relatively small with the codes, and it makes possible to construct a system having a compatibility among the various kinds of application software, by unifying the code lists.

Also, obviously it is preferable that the location information can be obtained and recorded easily, without performing an extra operation at a time when picture-taking.

In the above-mentioned Japanese Patent Laid-Open No. 6-11011, it is inconvenient since the operation of selecting the desired location information from the database for the location information at a time of picture-taking, and also the database for the location information is required to have a very large memory capacity as considering one camera to be used all over the world, and thus it has a disadvantage as to not enable to install it in a camera in a practical scope in fact. Also, it has a disadvantage as to enable to manipulate only the character information for the place name or the location name, and thus it is not suitable for a wide range of usage.

Further, in the above-mentioned Japanese Patent Laid-Open No. 4-70735, it is the one in which information for a location is recorded automatically at a time of a picture-taking, but the information to be recorded along with the image is only one kind that is determined by a predetermined

order of priority, and thus it has a disadvantage as to be not suitable for a wide range of usage.

Moreover, in the above-mentioned Japanese Patent Laid-Open No. 8-36217, encoded location information that is recorded automatically by a camera is converted by a second apparatus having a database of location information to information which is understandable by a human being, and then is displayed and printed along with an image, but it enables to manipulate only character information such as a place name and a location name and the likes, and as a result it has a disadvantage as not enabling to deal with a wide range of usage. Further, the location information recorded on a photo film along with an image is only encoded information, and thus it has an disadvantage as not enabling to transmit the character information such as the place name, the location name and the likes that are obtained from the database to a third apparatus, and as not enabling to reuse them.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an apparatus for enabling to deal with location information associated with an image of picture-taking, to a wide range of usage, by inputting the location information associated with the image of picture-taking, and by

converting the inputted location information to a plurality of signals in different representation forms.

It is another object of the present invention to provide a method of enabling to deal with location information associated with an image of picture-taking, to a wide range of usage, by inputting the location information associated with the image of picture-taking, and by converting the inputted location information to a plurality of signals in different representation forms.

It is yet another object of the present invention to provide a computer program product which is enable to deal with location information associated with an image of picture-taking, to a wide range of usage, by inputting the location information associated with the image of picture-taking, and by converting the inputted location information to a plurality of signals in different representation forms.

Accordingly, it is an another object of the present invention to provide an apparatus for enabling to deal with location information associated with an image of picture-taking, to a wide range of usage, by inputting, as original information, the location information associated with the image of picture-taking from an image recording medium into which the images of picture-taking are recorded, by converting the inputted original information to the location information in a predetermined representation form, and by

recording the converted location information in the predetermined representation form into the image recording medium.

It is another object of the present invention to provide a method of enabling to deal with location information associated with an image of picture-taking, to a wide range of usage, by inputting, as original information, the location information associated with the image of picture-taking from an image recording medium into which the images of picture-taking are recorded, by converting the inputted original information to the location information in a predetermined representation form, and by recording the converted location information in the predetermined representation form into the image recording medium.

It is yet another object of the present invention to provide a computer program product which is enable to deal with location information associated with an image of picture-taking, to a wide range of usage, by inputting, as original information, the location information associated with the image of picture-taking from an image recording medium into which the images of picture-taking are recorded, by converting the inputted original information to the location information in a predetermined representation form, and by recording the converted location information in the predetermined representation form into the image recording

medium.

Further objects and advantages of the invention can be more fully understood from the following detailed description taken in conjunction with the accompanying drawings in which:

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing a configuration of a CRT monitor appreciation apparatus according to a first embodiment of the present invention;

Fig. 2 is an external view of the CRT monitor appreciation apparatus according to the first embodiment;

Fig. 3 is a configuration diagram showing the contents of a conversion table;

Fig. 4 is a flowchart showing an operation of the first embodiment;

Fig. 5 is a flowchart showing an operation of the first embodiment;

Fig. 6 is a configuration diagram showing a display example of the monitor;

Fig. 7 is a configuration diagram for illustrating a recording operation of the first embodiment;

Fig. 8 is a block diagram showing a configuration of a camera according to the first embodiment;

Fig. 9 is an external view of the camera according to

the first embodiment;

Fig. 10 is a flowchart showing an operation of the camera according to the first embodiment;

Fig. 11 is a configuration diagram for illustrating a recording operation of the camera according to the first embodiment;

Fig. 12 is a flowchart showing an operation of a CRT monitor appreciation apparatus according to a second embodiment;

Fig. 13 is a block diagram showing a configuration of a CRT monitor appreciation apparatus according to a third embodiment;

Fig. 14 is a flowchart showing an operation of the third embodiment; and

Fig. 15 is a configuration diagram for illustrating a recording operation of the third embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following, the preferred embodiments of the present invention will be described in more detail with reference to the drawings.

At first, a first embodiment of the present invention will be described.

First of all, it will describe about the parts for detecting location information and for recording it as

original information into a recording medium along with an image, with reference to Figs. 8 to 11. Fig. 8 is a block diagram showing a configuration of a camera, Fig. 9 is an external view of the camera, Fig. 10 is a flowchart showing an operation of the camera, and Fig. 11 is a diagram for illustrating a recording operation of the camera.

In Figs. 8 and 9, a numeral 101 denotes a camera, a numeral 102 denotes a microprocessor for controlling an operation of the camera, and in which a ROM, a RAM are installed, a numeral 103 denotes a photo-metering circuit (hereinafter, it is referred to as a metering circuit), a numeral 104 denotes a distance-measuring circuit, a numeral 105 denotes a shutter controlling unit, a numeral 106 denotes an auto-focus controlling unit, a numeral 107 denotes a display circuit for driving a display device 108, a numeral 109 denotes a clock circuit for counting a date, a time automatically, a numeral 110 denotes a data storing circuit for temporarily storing a data to be recorded, a numeral 111 denotes a feeding motor driving circuit for driving a photo film F that is accommodated in a cartridge, through a feeding mechanism 112, and a numeral 113 denotes a film feeding quantity detecting circuit for detecting a perforation P (see Fig. 11) that is provided in the film F by driving a photo-reflector 114, and for detecting a feeding quantity of the film.

A numeral 115 denotes a magnetic recording/reproducing circuit for recording a magnetic information into the film F through a magnetic head 116 or for reproducing the magnetic information recorded in the film F, a numeral 117 denotes a positioning receiver for receiving a radio wave of a GPS system, a numeral 118 denotes a receiving circuit for driving the positioning receiver and for calculating a current position (the latitude and the longitude) from the radio wave being received.

A numeral 119 denotes a main switch of the camera, a numeral 120 denotes a shutter button, a numeral 121 denotes a switch 1 that closes at a first stroke of the shutter button, a numeral 122 denotes a switch 2 that closes at a second stroke of the shutter button, a numeral 123 denotes a positioning switch for establishing whether a positioning by the positioning receiver 117 and the receiving circuit 118 should be implemented or not, a numeral 124 denotes a title switch for selecting a title of an image, which is to be recorded with the image, a numeral 125 denotes a DATE switch for establishing whether a date and time should be recorded or not with the image, a numeral 126 denotes an aspect ratio switch for selecting an aspect ratio of the image of the picture-taking, and a L denotes a picture-taking lens.

Herein, the photo film F is such that a magnetic recording layer that is a transparent optically and

practically is provided on a base surface side thereof (an opposite side of an emulsion painted surface), and it enables the magnetic recording and reproducing by the magnetic head from the base surface side of the film.

In the following, an operation of the camera will be described, based on the flowchart of Fig. 10. When the main switch 119 of the camera is turned ON, then at a step S101 (hereinafter, the word of step is omitted) it is determined whether the first stroke of the shutter button 120 is pressed or not, i.e., whether the switch 121 is closed (ON) or not, and it holds if it is not ON, but it proceeds to S102 if it is ON. At S102, it is determined whether the positioning switch 123 is being set to ON or not, and then proceeding to S105 as bypassing S103, S104 if it is OFF, but proceeding to S103 if it is ON.

At S103 the positioning receiver 117 is driven through the receiving circuit 118, and then proceeding to S104. At S104 a receiving radio wave of the positioning receiver 117 is calculated in the receiving circuit 118, and capturing a latitude and longitude information that is a result of the calculation thereof, and after having been temporarily stored in the data storing circuit 110, proceeding to S105. At S105 it is determined whether a record of a date and time is indicated by the DATE switch 125 or not, and proceeding to S107 as bypassing S106 if it is not indicated, but

proceeding to S107 as capturing the current date and time into the clock circuit 109 and temporarily storing it in the data storing circuit 110 if it indicated.

At S107 it is determined whether a title record is indicated by the title switch 124 or not, and proceeding to S109 as bypassing S108 if it is not indicated, but temporarily storing the content of the title being selected into the data storing circuit 110 and proceeding to S109 if it is indicated. At S109 storing he aspect ratio of the image of picture-taking that is selected by the aspect ratio switch 126 into the data storing circuit 110 and proceeding to S110. At S110 performing a metering of an object of picture-taking by the metering circuit 103, and proceeding to S111. At S111 performing a distance-measurement of the object of picture-taking, and proceeding to S112. At S112 it is determined whether the shutter button 120 is pressed down to the second stroke thereof or not, i.e., whether the switch 2 of 122 is turned ON or not, and returning to S101 and then holding if it is turned OFF, but proceeding to S113 if it is turned ON.

At S113 an operation of picture-taking is performed. That is, an auto-focus control is performed by driving the picture-taking lens L through the auto-focus controlling unit 106 based on the result of S111, and then an exposure to the film F is performed by driving the shutter

controlling unit 105 based on the result of S110.

Then, at S114 starting a feeding to the next picture-taking frame of the film F by driving the feeding motor driving circuit 111, and then proceeding to S115.

At S115 driving the magnetic head 116 through the magnetic recording/reproducing circuit 115, magnetic recording various kinds of segments of information that have been temporarily stored in the data storing circuit 110 on the magnetic recording layer of the film F, and then proceeding to S116.

At S 116 it is determined whether a film feeding for one frame is completed by the photo-reflector 114 and the film feeding quantity detecting circuit 113, and waiting until to complete if it is not completed, but proceeding to S117 and stopping the feeding motor by the feeding motor driving circuit 117 if it has been completed. As a result, the camera operation for one frame is to be finished.

In the following a state of the magnetic record that is recorded on the film F at S115 will be described with reference to Fig. 11.

F1, F2, F3,…denotes the respective picture-taking frames, and F1 denotes to be a first frame. In this figure as including the second frame they have been picture-taken, and the various kinds of segments of information corresponding to the respective frames have been recorded.

The information corresponding to the respective frames are recorded as being separated in the first magnetic track T1 and the second magnetic track T2. For the first frame F1, it becomes the first magnetic track T11, the second magnetic track T21, and for the second frame F2, it becomes the first magnetic track T12, the second magnetic track T22. Two magnetic tracks are respectively recorded by the first channel 116a and the second channel 116b of the magnetic head 116.

As being enlargedly exemplified in the first frame 1, the order of recordings of the first magnetic track T1 is arranged by SS (Start Sentinel) information indicating a beginning of the information, ID1 information indicating an ID of the date and time information, an actual date and time date following thereto, ID2 information indicating an ID of, aspect ratio information, an actual aspect ratio data following thereto, ID3 information indicating of an ID of title information, an actual title data following thereto, and ES (End Sentinel) information indicating an end of the information.

The order of recordings of the second magnetic track T2 is arranged by a SS indicating a beginning of the information, ID4 information indicating that it is location information detected by the positioning means, and is latitude and longitude information (original information)

that is recorded in a latitude and longitude form, an actual latitude and longitude date (original information data) following thereto, and ES information indicating an end of the information.

Herein, the original information is location information and the likes that are recorded at a time of picture-taking, and represents the location information that is already recorded in a recording medium along with an image, when a recording medium such as a photo film and the likes is loaded in a recording apparatus to be described below.

In the following, a recording apparatus according to the preferred embodiment of the present invention will be described with reference to Figs. 1 to 7.

Fig. 1 is a block diagram showing a configuration of the CRT monitor appreciation apparatus that is the recording apparatus, Fig. 2 is an external view, Fig. 3 is a diagram for illustrating the contents of the conversion table in Fig. 1, Figs. 4 and 5 are flowcharts for illustrating the operation of the CRT monitor appreciation apparatus, Fig. 6 is a diagram for illustrating a display example on the CRT monitor, and Fig. 7 is a diagram for illustrating a recording operation of the appreciation apparatus.

In Figs. 1 and 2, a numeral 1 denotes a CRT monitor appreciation apparatus, a numeral 2 denotes a main body of

the CRT monitor appreciation apparatus, a numeral 3 denotes the CRT monitor, a numeral 4 denotes a mouse for implementing various kinds of inputs, a numeral 5 denotes a keyboard, a letter C denotes a film cartridge in which the photo film F having a magnetic recording layer is installed. The photo film F is already picture-taken, and is already developed, thereby existing an image that is clearly imaged. Further, the information that is magnetic recorded on the film at a time of the picture-taking remains in the state as it is.

A numeral 5 denotes a microprocessor for controlling an operation of the appreciation apparatus that is provided within the main body 2, and in which a ROM, a RAM are installed. A numeral 6 denotes an illumination driving circuit for illuminating an image on the film F by driving an illumination light source 7. A numeral 8 denotes an illumination box for obtaining a uniform illumination, a numeral 9 denotes an optical system for image-forming an image on the film F onto a CCD 10, a numeral 16 denotes a CCD driving circuit, a numeral 11 denotes an image processing circuit for implementing a white balance adjustment, an exposure compensation based on the exposure data inputted from key board 4, the mouse 3, a color compensation, an addition of a superimpose of various kinds of segments of information and the likes, and for causing

the CRT monitor 3 to display the last image.

A numeral 12 denotes a photo-reflector, which detects barcode information that is clearly imaged on the film F. A numeral 13 denotes film information detecting circuit, which reads a maker name, a classification and the likes of the film according to the barcode information detected by the photo-reflector 12, and inputs them to the microprocessor 5. A numeral 14 is another photo-reflector, which detects the perforation P on the film F. A numeral 15 denotes a film feeding quantity detecting circuit, which detects a feeding quantity of the film according to the perforation signal detected by the photo-reflector 14, and inputs it to the microprocessor 5.

A numeral 17 denotes a feeding motor driving circuit, which performs a feeding of the film F through a feeding motor (not shown), and a feeding mechanism 18. A numeral 19 denotes a reproducing head, and a numeral 20 denotes a magnetic reproducing circuit, which performs a reproduction of the information that is magnetic recorded on the film F. A numeral 20 denotes a recording head, and a numeral 21 denotes a magnetic recording circuit, which performs an additional recording of new information to the film F and a re-recording of the information in which a content thereof is modified.

A numeral 23 denotes a cartridge detecting switch,

which detects whether a film cartridge C is loaded in the main body 2 or not, and inputs it to the microprocessor 5. A numeral 24 denotes a main switch, a numeral 25 denotes a feeding switch that indicates one frame feeding of a film, a numeral 26 denotes a rewind switch that indicates a rewind of a film, a numeral 27 denotes an injector switch, which is a mechanical switch at a time when injecting a film. A numeral 28 denotes a conversion table, which is a storage device in which a corresponding table of the information in the various kinds of forms for the locations is recorded.

Herein, a content of the conversion table 28 will be described, based on the example in Fig. 3.

The conversion table 28 is the one which relates the latitude and longitude information recorded in the latitude and longitude recording form applicable to the original information, the place name, location name as the character information recorded in the corresponding character recording form, and the barcode number as the code information recorded in the code recording form, one-by-one.

It is preferable that the above-mentioned three kinds of recording forms of the information are determined with the most suitable forms to the respective information. In Fig. 3, it is set that the original information (the latitude and longitude information) is in a form of the latitude and the longitude being recorded identifiably, the

character information is in a form of being recorded with the character string using the character set defined by the IS0646 and the likes, and the code information is in a form being recorded with the numerical string.

Returning to Fig. 1, a numeral 29 denotes a selection switch, that is a switch for selecting either a first recording form (the place name, location name that are the character information) that is obtained through the conversion table 28 from the original information for the location (the latitude and longitude information) or a second recording form (the code numbers that are the code information).

In the following, an operation of the CRT monitor appreciation apparatus will be described, based on the flowcharts in Figs. 4 and 5.

When the main switch 24 is turned ON, at step S10 it is determined whether the cartridge C is loaded or not according to a state of the cartridge existing/non-existing switch 23, and holding if it is not loaded, but proceeding to S11 if it is loaded. At S11 driving the CCD 10 through the CCD driving circuit 16, and then proceeding to S12. At S12, driving the light source 7 through the illumination driving circuit 6, and then proceeding to S13. At S13, rotating the feeding motor through the feeding motor driving circuit, starting a feeding of the film F, and then

proceeding to S14.

At S14, the information of the film maker name, the film classification, the number of picture-taking frames and the likes are read from the barcode information on the film F by the photo-reflector 19, and the film information detecting circuit 13, and then proceeding to S15. At S15, a reproduction, decoding and storing operations of the information that is magnetic recorded on the film F are performed by the reproducing head 19, the magnetic reproducing circuit 20, and then proceeding to S16. At S16, it is determined whether the beginning of the first picture-taking frame of the film F is completed or not, by the photo-reflector 14 and the film feeding quantity detecting circuit 15, and waiting for the completion if it is not completed, but proceeding to S17 if it is already completed.

At S17, stopping the feeding motor, and then proceeding to S18. At S18, it is determined whether the rewind switch 26 is turned ON or not, and if it is turned ON, then reversing the feeding motor at S19, and after having been waited for a completion of a rewind of the film at S20, stopping the feeding motor at S21, and rejecting the cartridge C at S22 and then finishing. On the other hand, if the rewind switch 26 is not turned ON at S18, proceeding to S23. At S23, performing a picture-taking of an image by the CCD10, the CCD driving circuit 16, and then proceeding

to S24. At S25, performing a white balance adjustment of the image by the image processing circuit 11, an exposure compensation based on an exposure compensation data inputted from the keyboard 4, the mouse 3, and a color compensation and the likes, and then proceeding to S25 and performing a display of the image by the CRT2.

Then, proceeding to S26, and it is determined whether the original information (the latitude and longitude information) that is the local information is to be included or not among the magnetic information read by the magnetic reproducing circuit 20, and proceeding to S29 as bypassing the S27 and S28 if it is not included, but proceeding to S27 if it is included. At S27 determining the character information (place name, location name) and the code information (code number) corresponding to the original information that is recorded, by retrieving the conversion table 28, and then proceeding to S28. At S28, displaying the determined character information and the code information as being superimposed with the original information on the CRT 2 through the image processing circuit 11. Then, at S29, superimposing the information other than the location information.

Fig. 6 shows a display example of the CRT monitor 2 at that time, and there are displayed the date and time information 2a, the aspect ratio information 2b, the title

information 2c, the latitude and longitude information 2d that is the original information of the location information, the character information 2e that is selected as the retrieval result and the code information 2f. Next, at S30 it is determined whether the character information or the code information is selected by the selection switch 29, and at S31, S32 storing the information that are the ones selected, and then proceeding to S33. In the CRT monitor, it makes possible to confirm which information is selected with the selection marks of 2g, 2h in Fig. 6.

At S33, it is determined whether the feeding switch 26 is turned ON or not, and returning to S30 if it is not turned ON, but proceeding to S34 if it is turned ON. At S34, starting a film feeding by rotation-driving the feeding motor, and then proceeding to S35. At S35, magnetic recording of the location information that is stored at S31 or at S32 on a film by the recording head 21, the magnetic recording circuit 22, and then proceeding to S36. At S36, as similar to S15, performing the reproducing, decoding, and storing operations for the magnetic information that is recorded on the next picture-taking frame, and then proceeding to S37. At S37, it is determined whether a film feeding for one frame is completed or not, and waiting for a completion if it is not completed, but proceeding to S38 if it is completed.

At S38, it is determined whether a last frame of a film is completed or not, returning to S17 if it is not completed, and performing the operations that are similar to the ones described as above. Proceeding to S18 if it is determined that the operation of the last frame is completed at S38, and performing an operation of a rewind of the film.

Now, it will describe a state of a magnetic recording that is recorded on the film F at S35, with reference to Fig. 7. Herein, it shows a case in which the character information that is recorded in the character form is selected as the location information at S30. Further, for the same elements in Fig. 11 the same symbols are attached thereto and the descriptions thereof are omitted.

Since the recorded content of the first magnetic track T1 is not changed, it becomes the same as the one at a time of picture-taking (Fig. 11). The recorded content of the second magnetic track is such that the location information is changed and re-recorded from the original information to the character information, and the order of this recording becomes as a SS (Start Sentinel), ID5 information indicating of being the character information that is recorded in the character form, followed by the character information data, and an ES (End Sentinel) indicating an end of the information.

When the code information is selected as the location

information at step S30, instead of the ID5 information, ID6 information indicating of being the code information which is recorded in a code form that is to be the location information, and instead of the character information data, the code number data are respectively recorded.

In the present embodiment, it makes possible to obtain the character information or the code information, of which the original information as being the location information is converted, and to re-record this on the film in place of the original information. Further, desirable information can be recorded selectively from the character information and the code information.

In the following, the second embodiment will be described.

A configuration of the CRT monitor appreciation apparatus in the present embodiment is the same as in Fig. 1, and it is assumed to adopt this, but it differs from the first embodiment in such a point that for the location information, the original information can be selected besides the character information, the code information by the selection switch 26.

Fig. 12 is a flowchart for illustrating an operation of the present embodiment, and is equivalent to Fig. 5 of the first embodiment, and in Fig. 12, the same step numbers are attached to the steps that are the same as in the ones in

Fig. 5.

S30 in Fig. 5 is equivalent to S50 in Fig. 12. At S50, it is determined whether the original information (the latitude and longitude information as being recorded in the latitude and longitude form), the character information, or the code information is selected by the selection switch 26, and proceeding to S51 and storing the original information if the original information is selected, but proceeding to S31 and storing the character information if the character information is selected, or proceeding to S33 after storing the code information if the code information is selected. Thereafter, the similar operations as the ones in the first embodiment are performed.

In the present embodiment, it makes possible to retain the original information on the film as it is, other than only the converted information such as the character information, and the code information.

In the following, the CRT monitor appreciation apparatus according to the third embodiment will be described with reference to Figs. 13 to 15.

Fig. 13 is a configuration diagram, and the same number are attached to the elements that are the same as the ones in Fig. 1. It differs from Fig. 1 in the point such that the selection switch 29 is not provided, but instead thereof there are provided three switches of the original

information switch 51 for indicating a record of the original information (the latitude and longitude information in the present embodiment), the character information switch 52 for indicating a record of the character information, and the code information switch 53 for indicating a record of the code information. It is arranged that three switches can be made a setting of ON/OFF individually, that is, it can be made a setting of an indication/no-indication of a record for each information.

Fig. 14 is a flowchart for illustrating the operations, and the same step numbers are attached to the operations that are the same as the ones in Fig. 5.

Proceeding from S29 in Fig. 4 according to the first embodiment, at S60, it is determined whether the original information switch 51 is turned ON or not, and proceeding to S61 as bypassing S62 if it is not turned ON, but proceeding to S61 if it is turned ON. At S61, storing the corresponding original information (the latitude and longitude information) and proceeding to S62. At S62, it is determined whether the character information switch 52 is turned ON or not, and proceeding to S64 if it is not turned ON, but proceeding to S63 if it is turned ON.

At S63, storing the corresponding character information (the place name, the location name), and proceeding to S64. At S64, it is determined whether the code information switch

is turned ON or not, and proceeding to S66 if it is not turned ON, but proceeding to S65 if it is turned ON. At S65, storing the corresponding code information (the code number) and proceeding to S66. At S66, it is determined whether the feeding switch 25 is turned ON or not, and returning to S60 if it is not turned ON, but proceeding to S34 if it is turned ON. It will be the same operations as in Fig. 5 after S34, and at S35, the location information being stored at S60 to S65 are magnetic recorded on the film.

Fig. 15 is a diagram for illustrating a state of the magnetic record that is recorded on the film F in the present embodiment, and the same numbers are attached to the elements that are the same as the ones in Fig. 7.

Herein, at the steps of S60 to S65, all three kinds of data of location information are indicated, and at the step S35, the state of being magnetic recorded is indicated. Since the recorded content of the first magnetic track T1 is not changed, it is the same as the one at a time of picture-taking (Fig. 11).

All three kinds of data of location information are recorded on the second magnetic track T2, and it is arranged as a SS (Start Sentinel) indicating a beginning of the information, ID4 information indicating of being the original information, i.e., the latitude and longitude information that is recorded in the latitude and longitude

form, followed by the original information data, ID5 information indicating of being the character information that is recorded in the character form, followed by the character information data, ID6 information indicating of being the code information that is recorded in the code form, the code information data, and an ES (End Sentinel) indicating an end of the information.

In the present embodiment, besides the above-mentioned recording of all three kinds of segments of information including the original information, it is available an individual recording of the respective information, and/or a recording of combining any two kinds of segments of information.

The individual components shown in schematic or block form in the Drawings are all well-known in the camera arts and their specific construction and operation are not critical to the operation or best mode for carrying out the invention.

While the present invention has been described with respect to what is presently considered to be the preferred embodiments, it is to be understood that the invention is not limited to the disclosed embodiments. To the contrary, the invention is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims. The scope of the following claims

to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

For example, in the embodiments described as above, the images associated with the location information are the picture-taking images, but the present invention is applicable to the images other than the picture-taking images.

Further, in the third embodiment, when the latitude and longitude information that is the original information is selected, it is arranged to re-record this information, but it may be arranged to use the recorded original information as it is, so as to not re-record.

Moreover, in the first to the third embodiments, it is illustrated for the photo film having the magnetic recording layer as the recording medium for recording the image and the location information, but it is not limited thereto. There are a memory card, a floppy disk and the likes as the suitable ones of other recording media. In these cases, it is easy to modify the CRT appreciation apparatus and the camera to the structures suitable for these recording media.

Further, the CRT monitor appreciation apparatus is exemplified as the recording apparatus, but it is not limited thereto, and as the suitable examples for the recording apparatus, there are an apparatus for producing a

print from a photo film (in this case, the location information is recorded on a paper and the likes on which a print is produced, and a recording form thereof may be selectable), an image reproducing apparatus for a computer processing, and the likes.

Moreover, as the original information of the location information, the latitude and longitude information based on the GPS system, which is detected by the camera, is exemplified, but it is not limited thereto, and it may be the one showing the location information that is recorded on the recording medium in advance at a time when the recording medium is loaded on the recording apparatus, and for example, it may be positional information obtained from a radio wave of a communication base station, location information of which the content thereof is transferred from other recording medium and then is recorded, and the likes.

In the following, a recording medium according to the present invention will be described.

The systems according to the respective embodiments shown in Figs. 1, 2, 8, 9 and 13 and the likes may be constructed in a hardware, or they may be constructed in the computer systems constituting of a CPUs, a memory and the likes. When constructing in the computer system, the above-mentioned memory constitutes the recording medium according to the present invention. In this recording medium, there

is stored a program for performing the processes included in the flowcharts and the likes of Figs. 4, 5, 10, 12, 14 described above, and it constitutes a computer program product for providing the program.

Moreover, as this recording medium, a semiconductor memory such as a ROM, a RAM and the likes, an optical disk, a magneto-optical disk, and a magnetic recording medium and the likes may be used, and they may be constituted as a CD-ROM, a FD, a magnetic card, a magnetic tape, a non-volatile memory card and the likes.

Accordingly, by using this recording medium in other system or an apparatus other than the systems according to the above-mentioned respective embodiments, and as the system or the computer reads and performs the program codes stored in the recording medium, it enables to implement the functions and effects that are equivalent to the ones in the respective embodiments described as above, thereby achieving the objects of the present invention.

Further, when the OS and the likes running on the computer perform a portion of or all of the processes, or after the program codes read from the recording medium are written into a memory that is provided in an extension board inserted into the computer or in an extension unit connected to the computer, and when the CPU and the likes provided in the above-mentioned extension board or extension unit

perform a portion of or all of the processes based on the instructions of the program codes, it enables to implement the functions and effects that are equivalent to the ones in the respective embodiments described as above, thereby achieving the objects of the present invention.

Moreover, the present invention is that the technical elements of the embodiments as described above may be combined as required.

Further, the present invention is that a portion of or all of the constituents of the claims or of the embodiments may form one apparatus, or may combine with other apparatus, or may be the one as being an element constituting an apparatus.